

REMARKS

This application has been reviewed in light of the Office Action mailed on November 30, 2006. Claims 1 to 18 are currently pending in the present application. Claims 1, 6 and 11 are amended herein. The amendments are supported by the specification and no new matter has been added by the amendments.

The Action states that the listing of references in the specification does not meet the requirements of a proper information disclosure statement. The Action further states that 37 CFR 1.98(b) requires a list of all patents, publications or other information submitted to the Office for consideration. Applicants respectfully submit that a proper and separate information disclosure statement under 37 CFR 1.97(b)(3) was submitted in the present matter on September 13, 2005. The Applicants also submitted a form PTO/ISB/O8A together with foreign and publication references. Applicants respectfully request further explanation as to the nature of the inadequacy of the submitted documents in light of 37 CFR 1.98(b).

The disclosure stands objected to because the specification refers to the claims by number. The specification has been amended to include a description of the relevant claims so as to avoid inconsistencies in the case of claim amendments.

The specification has further been objected to due to grammatical errors. In paragraph 11 on pages 2 and 3, the phrase “in such manner” has been changed to “in such a manner”. The phrase “these plural” has been changed to “this plurality”.

Claims 2 to 4, 6, 9 and 11 stand objected to under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject which the applicant regards as the invention. Specifically, claim 2 recites the term “substantially”. The Action states that “substantially” is not defined by the claim or specification. Applicants respectfully submit that the term “substantially periodic” is

sufficiently defined by the specification. The specification clearly states that the prime problem for acquiring an appropriate 3D or 4D data set from the 2-dimensional images is the movement of items within the human or other body under consideration, which movement is sometimes substantially periodic, but not completely so. In other circumstances, the object in question, such as an intestine can be considered as moving in quite an irregular manner. Furthermore, the object may undergo secondary motion, such as caused by breathing or consciously moving (page 1, lines 10 to 13). The specification further states that the apparatus that is the subject of the present invention allows formation of two-dimensional X-Ray images of an object to be examined in particular an object that moves (quasi-)periodically, such as a heart and its associated coronary vascular system, or alternatively, an object that moves rather unpredictably, such as an intestine or part thereof (page 2, lines 16 to 20).

The term "which reference images have 'substantially' differing projection orientations" is also clearly described by the specification, which states that the C-arm can be rotated over an angle such as 180° around its center in the direction of double arrow 20 through a motor drive not shown. The C-arm accommodates an X-Ray source 12 and an X-Ray image pick-up 13, that are aligned relative to each other in such manner that an X-Ray image can be formed of a certain volume around the above center. These plural of X-Ray images show the volume under examination generated by respective different angular orientations of the image forming system 12, 13 that are in part shown by dashed lines of Fig. 1 (page 2, lines 26 to 32). The term "substantially" is often used in conjunction with another term to describe a particular characteristic of the claimed invention. In *In re Nehrenberg*, 280 F.2d 161, 126 USPQ 383 (CCPA 1960), the court held that the limitation "to substantially increase the efficiency of the compound as a copper extractant" was definite in view of the general guidelines contained in the specification. In *In re Mattison*, 509 F.2d 563, 184 USPQ 484 (CCPA 1975), the court held that the limitation "which produces substantially equal E and H plane illumination patterns" was definite because one of ordinary skill in the art would know what was

meant by "substantially equal." Applicants submit that claims 3, 4 and 9, depending from claim 2 are definite for the reasons discussed with respect to claim 2.

Claim 6 recites the term "more advantageous". The Action states that "more advantageous" is not defined by the claim or specification. Claim 6 has been amended to claim "[t]he method as claimed in Claim 1, wherein two-dimensional projections are corrected towards their calculated shape by the functionality process of said object". Claim 6 now complies with the requirements of 35 U.S.C. 112.

Claim 11 recites the term "physical elements" together with a descriptive limitation. The Action states that "physical elements" is not defined by the claim or specification. Claim 11 has been amended to claim "[t]he method as claimed in Claim 1, whilst deriving said motion correction from physical elements present in the object". Claim 11 now complies with the requirements of 35 U.S.C. 112.

Claims 1 to 6, 10, 13, 14, 17 and 18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by European Patent No. WO 02/103,639 A2 to Rasche et al. (hereinafter "Rasche"). Rasche is cited for disclosing forming a set of a plurality of two-dimensional X-Ray projection images of a medical or veterinary object to be examined through a scanning rotation by an X-Ray source viz à viz said object, which X-Ray images are acquired at respective predetermined time instants with respect to a functionality process produced by said object; reconstructing by back-projection a three-dimensional volume image of said object from the set of X-Ray projection images, and deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field, and subsequently from the various corrected two-dimensional images reconstructing the intended three-dimensional volume. Applicants respectfully submit that Rasche does not expressly or inherently disclose all of the elements set forth in independent claim 1. Thus, Rasche does not anticipate claim 1.

As disclosed in the subject application, it is an object of the subject application to raise the number of useful *two-dimensional* images by providing motion correction for the respective two-dimensional images to reconstruct from various corrected two-dimensional images the intended three-dimensional volume (page 1, lines 23 to 25). Rasche fails to disclose a method or device for forming a set of a plurality of two-dimensional X-Ray projection images of a medical or veterinary object to be examined through a scanning rotation by an X-Ray source viz à viz said object, reconstructing by back-projection, a three-dimensional volume image of said object from the set of two-dimensional X-Ray projection images, and deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field, as clearly claimed in claim 1. Rather, Rasche is directed to a method and a device for the reconstruction of a high-resolution 3D image of an examination zone of a patient from *a 3D image data set* of the examination zone, the examination zone being subject to a periodic motion which is measured, in parallel with the acquisition of the 3D image data set, as a motion signal which represents the periodic motion. Rasche therefore fails to disclose either forming a set of a plurality of two-dimensional X-Ray projection images or reconstructing by back-projection, a three-dimensional volume image from the set of two-dimensional X-Ray projection images. Accordingly, for at least these reasons, independent claim 1 is patentable over Rasche. Accordingly, the rejection under 35 U.S.C. § 102(b) of claim 1 should be withdrawn and claim 1 should be allowed. Claims 2 to 6, 10, 13, 14, 17 and 18, which depend directly or indirectly from claim 1 are also patentable for at least the reasons discussed.

Claims 7 to 9 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Rasche in view of U.S. Patent Publication No. 2003/007593 to Heuscher et al. (hereinafter "Heuscher"). Applicants respectfully submit that the combination of Rasche and Heuscher does not render obvious independent claim 1 or claims 7 to 9, 11, 12, 15 and 16, which depend from claim 1.

As discussed, Rasche fails to disclose a method or device for forming a set of a plurality of two-dimensional X-Ray projection images of a medical or veterinary object to be examined through a scanning rotation by an X-Ray source viz à viz said object, reconstructing by back-projection, a three-dimensional volume image of said object from the set of two-dimensional X-Ray projection images, and deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field, as clearly claimed in claim 1.

Heuscher also fails to disclose a method or device for forming a set of a plurality of two-dimensional X-Ray projection images of a medical or veterinary object to be examined through a scanning rotation by an X-Ray source viz à viz said object, reconstructing by back-projection, a three-dimensional volume image of said object from the set of two-dimensional X-Ray projection images, and deriving an appropriate motion correction for the respective two-dimensional images as based on a motion vector field. Huscher, directed to dynamic volumetric cardiac imaging using computed tomography, clearly fails to disclose a method or apparatus for reconstructing by back-projection, a three-dimensional volume image of said object from a set of two-dimensional X-Ray projection images. Claims 7 to 9, 11, 12, 15 and 16 depend directly or indirectly from claim 1 and provide further features thereto. Accordingly, claims 7 to 9 and 16 are clearly distinguishable over the combination of Rasche and Heuscher for at least the reasons discussed with respect to claim 1.

Accordingly, the rejections under 35 U.S.C. § 103(a) of claim 1 and claims 7 to 9 and 16, which depend therefrom should be withdrawn and claims 1 and 7 to 9 and 16 should be allowed.

Claims 11, 12 and 16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Rasche in view of Kehl et al. (Computers & Graphics 24 (2000) 731-739) (hereinafter “Kehl”), U.S. Patent No. 6,501,848 to Carroll et al. (hereinafter “Carroll”) and Koenig et al. (Dynamic Reconstruction for Radiotherapy Planning; 2002;

CARS; pp. 521-536) (hereinafter “Koenig”), respectively. Applicants respectfully submit that neither Kehl, nor Carroll nor Koenig remedies the failure of Rasche to disclose the invention of claim 1, as previously discussed. Accordingly, were Rasche combined with Kehl, Carroll or Koenig, as suggested by the Action, the cited combination still would fail to render obvious independent claim 1 or claims 11, 12 and 16, which depend from claim 1. Applicants therefore request that the rejections under 35 U.S.C. § 103(a) of claims 11, 12 and 16, which depend from claim 1 be withdrawn.

Conclusion

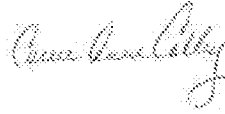
In view of the foregoing, Applicants respectfully submit that the specification, the drawings and all claims presented in this application are currently in condition for allowance. Accordingly, Applicants respectfully request favorable consideration and that this application be passed to allowance.

Should any changes to the claims and/or specification be deemed necessary to place the application in condition for allowance, the Examiner is respectfully requested to contact the undersigned to discuss the same.

Appl. No. 10/549,267
Amdt. Dated February 28, 2007
Reply to Office Action of November 30, 2006

Applicants' representative believes that this response is being filed in a timely manner. In the event that any extension and/or fee is required for the entry of this amendment the Commissioner is hereby authorized to charge said fee to Deposit Account No. 14-1270. An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,



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